Running head: EFFECTIVE FIRE SAFETY EDUCATION

Leading Community Risk Reduction

Choosing an Effective Fire Safety Education Program for the Ashtabula Division of Fire

Ronald F. Pristera

Ashtabula Division of Fire

Ashtabula, Ohio

May 2008

Appendices Not Included. Please visit the Learning Resource Center on the Web at http://www.lrc.dhs.gov/ to learn how to obtain this report in its entirety through Interlibrary Loan.

Abstract

The Ashtabula Division of Fire (ADF) currently teaches fire safety topics in pre kindergarten through the third grade. The messages and presentation techniques vary between grades, but are not the result past practice, not a risk analysis. There is no comprehensive fire safety message, just a patchwork of content and inconsistent objectives.

The problem is, this uncoordinated approach is inefficient, wastes valuable instructor and student time, and may result in a potentially confusing, ineffective, or incorrect fire safety message.

The purpose of this descriptive research is to identify what fire safety curricula is available to the ADF, how to select the most appropriate material, and collect information on the most effective teaching techniques for elementary school children.

The research questions for this project focused on the materials and methods used by other fire departments to teach fire safety, how the departments established their curricula and elementary school teachers' thoughts on their students and fire safety education. Two questionnaires were developed and administered, one to the fire service, the second to elementary school teachers.

Numerous materials are available to use that covers many topics and age groups, but there are few coordinated programs. Fire departments have varied ways of selecting their education programs. With few exceptions, fire departments are delivering vary similar educational messages via similar methods.

Teachers described the characteristics of their students very differently and generally preferred more interactive teaching methods to lectures and passive methods. They also

generally agreed on the barriers to effective safety education and the need for fire department involvement in safety education. There was less agreement on how to resolve the barriers.

To maximize effectiveness, the ADF must complete a formal assessment of its fire problem, and then select the most effective messages to reduce the risk. ADF must also establish collaboration with the schools to teach risk reduction. Finally, the ADF must explore non-traditional approaches to fire safety education.

CERTIFICATION STATEMENT

I herby certify that this paper constitutes my own product, that where the language of others is set forth, quotation marks so indicate and appropriate credit is given where I have used the language, ideas, expressions, or writings of another.

Signed:_____

Several people were instrumental in helping with this project. These include, Jeff Workman who built the electronic questionnaire, Rosemary Bernato who provided valuable insight into the teacher questionnaire, and Susan Moravitz who helped review the teacher questionnaire. I would also like to thank the building principals who distributed and collected the questionnaire. Thank you all.

CONTENTS

Introduction

The Ashtabula Division of Fire (ADF) currently teaches fire safety topics in grade levels from pre-kindergarten (PK) to the third grade (GL3). The messages and presentation techniques vary from grade level to grade level but are not the result of a risk analysis, simply the continuation of past practice. The department's Fire Marshal, firefighters, and civilian contractors teach programs. These groups are not coordinated or consistent; therefore, there is no comprehensive fire safety message, but simply a patchwork of content and inconsistent objectives.

The problem is, that this uncoordinated approach is inefficient, wastes valuable instructor and student time, and may result in a potentially confusing, ineffective, or incorrect fire safety message.

The purpose of this descriptive research is to identify what fire safety curriculums and messages are available to the ADF and how to select the most appropriate material for the children in our schools.

Research Questions

A. What juvenile fire safety education curricula/materials are other fire departments using?

B. How do other fire departments establish their fire safety education programs?

C. What are the characteristics of Kindergarten through fourth grade school children?

D. What teaching techniques do elementary school teachers think are most effective for their grade levels?

Background and Significance

Ashtabula, Ohio is a small charter city located in Northeastern Ohio. Situated in a rural agricultural/industrial area, the City of Ashtabula occupies 7.8 square miles and has 21,000 residents. The economic transition from an industrial-based economy to service-based has presented significant challenges for Ashtabula, consistent with those experienced by other Northeastern United States cities.

A public school system, Ashtabula Area City Schools (AACS), and a parochial elementary, middle and high school, Sts. John & Paul (STJP), serve Ashtabula. In all, there are seven elementary schools in Ashtabula containing 1919 children.

The ADF is made up of twenty-six sworn members, organized into three, eight-man platoons, one Captain of the Fire Prevention Bureau (FPB), and the Chief. In addition to the full-time Captain, seven other department members are collaterally assigned to the FPB either as Fire Marshals or as Fire Safety Inspectors. The FPB is responsible for public education, fire inspections, fire investigation, plan review, and code enforcement. In light of these significant and varied responsibilities, efficient use of Bureau time is paramount.

Our current efforts in the schools are not well-coordinated and are not the result of planning. We use the business as usual approach. If we can develop a coordinated school fire safety education plan that builds on earlier lessons and incorporates the Ohio primary school curriculum, we will increase our efficiency and free resources that can be used to broaden our fire safety education audience or to address another need in our community.

This research goes to the heart of the Leading Community Risk Reduction Class (LCRR), developing community partnerships and reducing community risk. The LCRR class teaches a methodical approach to risk reduction that includes analyzing risk, developing support,

administering a program then evaluating it. This research will provide some of the information that our department needs to evaluate its fire safety education activities and, where necessary, modify them to improve their efficiency. The research has already helped our department reach out to our school system to develop the partnerships necessary for effective community risk reduction.

This research supports all of the United States Fire Administration (USFA) operational objectives, but is primarily intended to influence the objective of reducing fire fatalities in children under the age of fourteen. This research may also develop recommendations that can be incorporated into all hazard risk reduction plans. While the direct topic is fire safety education, the information gathered in this project should be applicable to some facets of an all-hazard risk reduction plan.

Literature Review

What juvenile fire safety education curricula/ materials are other fire departments using?

Entering the text search “fire safety educational material” into an Internet search engine yields over 250,000 hits. Some of the results will be quite familiar to fire departments, including the USFA and the National Fire Protection Administration (NFPA); other results will be less familiar, or completely unknown.

To simplify the process, a Fall 2007 NFPA catalog was reviewed to categorize what types of materials are available for each grade level. It is difficult to correlate the target age of the material directly to a grade level because the NFPA material frequently cites an age range. The results of the tabulation process are shown in Tables 1 and 2. The suggested targeted age groups listed in the tables are those suggested by the NFPA in the catalog.

Table 1

Summary of quantity of fire safety material available by age group.

Age Group	Video/DVD	Coloring Book	Poster/Brochure	Game
K-2	1	1	0	0
2-4	2	1	1	1
3-6	2	2	0	0
6+	1	0	6	0
Family	2	0	0	0
Adult	1	0	5	0
Senior	1	0	0	0

Table 2

Fire Safety Topic by age distribution

Topic	K-2	2-4	3-6	6+	Adult	Family
Exit Drills			1	1		1
Fire Danger		1			1	
Smoke Alarm			1		1	
General Fire Safety		4	2	2	1	1
Sprinklers						1
Kitchen Fire Safety				1		
Carbon Monoxide				1		
Electrical Safety				1		
Fire Extinguishers					1	
College Fire Safety				1		
Fire Safety & the disabled					1	

Some of the NFPA programs are familiar to fire departments, including Risk Watch® (RW), Learn not to Burn, and the Sparky the Firedog series. With the exception of the RW program, which was researched by groups of teachers and fire safety professionals, the NFPA programs are not sequential. The other materials are simply targeted at specific topics; however, the NFPA programs are tested on target audiences. (S. Gamache, personal communication, December 17, 2007).

When asked about the lack of coordinated, sequential program that a fire department could acquire and adopt, Ms. Gamache feels it would be “worthwhile to happen,” but stresses the need for fluidity in the program. She also stresses that high-risk kids may need a different message than “middle class” kids, and that the message must be age and audience appropriate (S. Gamache, personal communication, December 17, 2007).

The USFA is another potential source of educational materials for fire departments. It provides free materials to fire departments upon request via their website (USFA Publications, n.d.). An attempt was made to create a table similar to Tables 1 and 2; the format of the website however, prevented this from occurring. Material is sorted only by broad subject or media type. The website does state that over 400 hundred publications are available. In addition to their printed materials, the USFA maintains a website geared toward children that teaches fire safety and risk reduction.

When asked why neither the USFA or NFPA have a coordinated, sequential fire safety education message, Kathy Gerstner of the USFA cites the locality of fire departments, the wide variance in communities and the possibility that the fire safety message may be better directed at parents. “Kids under age five don’t control their own destiny,” says Gerstner. (K. Gerstner, Personal communication, December 18, 2007).

The Home Safety Council (HSC) maintains an Internet website that contains fire and home safety information as well. There is a smaller selection of educational materials, but the site does contain guides for parents and teachers and an interactive webpage and has bilingual material available (Home Safety Council, 2008).

A cursory review of several fire department trade journals also finds other sources of fire safety materials also. The December 2007 issues *of Fire Engineering , Fire Chief* and *Fire*

Rescue all contain advertisements for fire safety education materials ("Products/services/m," 2007; "Product Rewind," 2007; On the Market, 2007).

Other, less-traditional materials are available to fire departments, too. Characterization is another tool fire departments may use. Either inflatable costumes, remote control robots or puppets shows are all some of the resources departments can employ.

Firefighter Phil™ is an example of another resource that can be used to teach fire safety. In conjunction with the local fire department and funded by local advertising, third party educators address school assemblies with an interactive fire safety message complete with songs, puppets and activities (Firefighter Phil, 2008).

In light of the wide availability of materials, cost and content, the challenge for fire departments may be selecting the materials that best fill their individual needs.

How do other fire departments establish their fire safety education programs?

Before a fire department develops a new program or revises an old one, it should review data so that it can target the limited resources to the appropriate audience (Carter & Rausch, 1999).

To present effective fire safety education programs, fire departments must provide the kids with the vision of why fire safety is important to them. Learning is driven by vision, “kids learn how to ride bikes because they want to play with other kids who are riding bikes” (Senge, 2000, p. 22).

Understanding how to choose an effective education program requires fire departments to consider how children learn. Jean Piaget, a developmental psychologist, proposed an overview to view education based on several principals. These principals convey that: (a) children learn best when they actively seek solutions for themselves, (b) effective teachers design situations that

allow children to learn by doing, (c) consider the knowledge that children bring to the classroom, (d) teachers need to consider what children mean when they ask questions, (e) use ongoing assessments, (f) promote intellectual health, and (g) turn classrooms into a setting of exploration (Santrock, 2002).

The difference between three core concepts is the beginning of developing an effective program. Learning is the gaining of knowledge that results in change of attitude or behavior. Education is the process of teaching new skills. Information consists of facts, knowledge, or data. Information is the "raw materials of education" (Kirtley, 2003, p. 5-31). Nachbar puts it more succinctly when she states, "chances are many fire departments perform public *information* programs rather than public *education* programs" (Nachbar, 1995, p. 1075). Education programs have measurable goals and a built in evaluation tool, or a closure activity that demonstrates grasp of the intended material (Nachbar, 1995).

The LCRR class presents the community risk reduction model as an organized approach to creating a comprehensive program with the requisite support to succeed (see Appendix A). *The Fire Chief's Handbook* details a slightly different process for creating a successful fire prevention program (Nachbar, 1995, p 1076-1091).

Both plans are similar in their approach; (a) analyze the problem, (b) formulate a plan, (c) implement the plan, (d) evaluate the results, and (e) incorporate the information obtained in the evaluation into the program.

Age-appropriate content is another consideration for fire departments when creating both education and information programs. There are six general age groups; pre-school children, elementary school children, adolescents, adults, and older adults. Each group has different learning styles and characteristics that must be considered when formulating educational or

information content, however "There has been surprisingly little research about what kinds of messages motivate people to be fire safe" (Kirtley, 2003, p. 5-37).

What are the characteristics of Kindergarten through fourth grade school children?

The US school population is growing more diverse by the year. In 2004, almost ten million children (ages 5-17) spoke a language other than English at home. This represents almost 20% of all children in this age group (Lapkoff & Lee, 2006). Urban teachers frequently cite this diversity as a factor that increases the complexity of teaching (Voltz, 2000).

Several different sources speak to the relationship between socio-economic factors and performance in the classroom. Three factors in the home significantly affect a child's situation, married parents in the household, poverty, and secure parental employment (Lapkoff & Lee, 2006). The National Center for Education Statistics states, "first-time kindergartners are similar in many ways, their knowledge and skills differ in relation to their age at school entry, race/ethnicity, health status, home educational experiences, and child care histories" (National Center for, 2008). Finally, "It must also be acknowledged that education does not exist in a vacuum. The larger socioeconomic issues…impinge on student performance" (Voltz & Fore, 2006, p. 335). Yet another author links the condition of the home to student performance when he states;

> Home conditions may also be a good indicator of future performance.
>
> Children who begin kindergarten with certain resources seem to be at an advantage.
>
> Children who demonstrate early literacy skills and who come from a positive literacy environment, who possess a positive approach to learning, and who enjoy very good or excellent general health seem to perform better after 1 and even 2 years of formal schooling than children who do not have these resources (Denton, 2002, p 125).

In 2000, Congress enacted the No Child Left Behind Act (NCLBA), followed by the Individual with Disabilities Education Act (Rock, Greg, Edwin, and Gable, 2008). The passage of the NCLBA leads to an increasing use of tests to monitor progress towards meeting educational standards (Voltz & Fore, 2006). The widespread practice using these tests has profound affects on the educational process; however, some feel the NCLBA has fatal flaws that are insurmountable. These include such things as, NCLBA calls for an elimination of the achievement gap between all groups, but since students spend most of their time outside of the school, how can the schools be held accountable? It has been noted that "Multiple-choice achievement tests, the only tests cheap enough to
produce individual scores for large-scale, high-stakes accountability systems—are highly vulnerable to test-prep coaching." (Schaps, 2007, ¶ 9). Since these multiple-choice tests carry such high stakes, there is a tendency to teach to the test (Schaps, 2007).

Despite the problems, there does seem to be progress in complying with the mandates of the NCLBA. The National Center for Education Statistics reports that reading and math overall achievement scores are steadily rising (National Center, 2007).

What teaching techniques do elementary school teachers think are most effective for their grade levels?

Teaching is part art, part science, and "perhaps the most tradition laden strategy for instruction is the lecture" (Bland, 2007, p. 10). Lecture is frequently criticized as a form of instruction; nevertheless, the disadvantages of the lecture format of teaching may have more to do with the presenter than the medium. Effective lecturing requires the teacher to engage the listener (student) and present the material in a format that allows the students to absorb it.

Lectures are frequently used to “cram” large amounts of material in a limited amount of time, but a more effective technique may be the less is more approach (Bland, 2007).

Some of the topics covered in fire safety education involve hands on skills (stop, drop and roll, call 9-1-1, exit drills); Hellner suggests seven steps to teach skills. (a) identify the value of the skill, (b) explain the key techniques/steps, (c) model the skill, (d) let the learner undertake a guided, easy practice, (e) debrief the guided practice, and (f) practice and provide for repeat practice of the skill (Hellner, 2007).

The use of videos (tapes, CD, DVD) is another common instructional technique. Teachers, who use video report that their students retain more information, understand concepts more rapidly and are more enthusiastic about what they are learning. Video is uniquely suited to show students things that cannot be practically done in the classroom (Why Use Video, n.d.).

The key to using video effectively is preparation. An instructor can maximize learning opportunities by encouraging students to become active viewers (Using Video, 2008). Guided viewing is a technique that teachers can also use to increase the effectiveness of video. Teachers instruct students to look for specific information as they watch a video, after viewing; the students discuss the video and what they learned from it (McFarland, 2001). Video can also convey information quickly, so teachers can use short clips from longer programs to address a specific lesson goal (McFarland, 2001).

Elementary students have unique educational needs, including short attention spans, and lack the maturity to adapt to the classroom. To teach effectively, teachers need to revise their approach and use multiple teaching approaches. Activities that include various auditory, visual, and kinesthetic components can accommodate the various learning styles of students (Swift, T., & Watkins, S., 2004).

In a primer designed to motivate engineers to help elementary teachers teach science and math, Swift & Watkins make this statement than can easily be adapted by fire departments.

> Outreach may take many forms. Depending on teacher needs, engineers can provide new lesson plans, demonstrations, background resources, or simply time. The environment may be the classroom, a field trip, science fair activities, summer camps, etc. An important step in developing programs for elementary education is to find out what is already available. The teachers may not be aware of what is available or may not have the time to search for it. In addition, they are often limited to what they themselves can build in order to demonstrate concepts. Engineers may find that the existing resources apply for their outreach directly or serve as inspiration for dedicated development (Swift, T., & Watkins, S., 2004, p. 720).

Procedures

Several different instruments were used to collect information for this project. A questionnaire was created to solicit input from other fire departments about their existing fire prevention education programs (Appendix B). This instrument was formatted for Internet-based administration by the Information Technology Specialist of the author's fire department. The completed questionnaire was posted at the author's fire department website for ease of administration and the website was configured to email an electronic copy of the completed questionnaire to the author.

This instrument was distributed via several methods. A cover message with an electronic hyperlink (Appendix C) to the questionnaire was electronically distributed to members of the Ohio Fire Chief's Association Fire Executive Program, members of the author's current LCRR class and prior Executive Development class, and a Google group of Executive Fire Officer Graduates. In all, approximately three hundred people (representing an unknown, but fewer number of fire departments) received the invitation to complete the questionnaire through these resources. Additionally, the same message was submitted to TRADENET the USFA electronic bulletin board which is sent weekly to approximately 6500 subscribers, for publication on January 31, 2007.

The returned questionnaires were sorted for missing information and entered into a Microsoft Excel spreadsheet that mimicked the questions. The auto complete function of Excel was used to prevent duplication of results. The following steps were used to analyze the data.

1. The total number of questionnaires was counted.
2. Returned questionnaires with three or more errors/blank fields were deleted.

3. Multiple responses from the same department were compared and merged into one document.
4. The remaining questionnaires were counted.
5. Tables were created to summarize the results.

A second questionnaire was developed to solicit feedback from teachers in the elementary schools. Several drafts of this document were reviewed with one of the elementary school principals and a second grade teacher. These collaborations resulted in the final questionnaire (Appendix D). The completed document was printed in brochure format with an integrated cover letter (Appendix E), this brochure was hand delivered to the principal of five of the elementary schools in our local district. The principal was asked to either distribute the document to the K-4 teachers or permit the author to do so. In all cases, the principals were willing to distribute the questionnaire and collect the finished documents. The following steps were used to analyze the raw data.

1. Group (school) integrity of the completed questionnaires was maintained as all responses were counted.
2. Where appropriate simple averaging was done to determine the median score for each category in each school.
3. Where appropriate these medians were graphed on the same likert scale presented in the questionnaire.
4. Tables were then created to summarize the results.

Limitations of This Research

There are general limitations of the research conducted in this project and, specific limitations for each section.

Overall, several assumptions were made when processing data from the questionnaires. They include the fact that whoever completed the questionnaire was truthful and had sufficient knowledge to answer the questions appropriately. It was also assumed that the questionnaire was completed by a member of the department/organization listed in the returned questionnaire.

All of the instruments used in this research were developed by the author. They were intended to collect the information needed to answer the research questions for this project; the author is not a subject expert in elementary education, child psychology, or juvenile learning methodology. Because of the limited time allowed to complete this project, a limited number of questionnaires were sought. The fire department questionnaire was only submitted to TRADENT once and only five of the seven elementary schools received questionnaires.

To increase response rates the questionnaires were kept as short as possible. This brevity assumed that respondents understood the terms and references used throughout the questionnaire. Some of the submitted questionnaires had indications that the person completing the document did not fully understand the question. Of note in this category were several fire department responses that listed the same grade as both the most receptive and least receptive to fire safety education. Additionally, a number of fire departments stated their planning process was grade-level specific, but then stated they adapt their fire safety message to the audience at the moment. This inconsistency may be the approach consciously chosen by the fire department, or it may be the result of questionnaire itself.

Results

The summary of fire department responses to where they obtain their materials, what audiences they present them to, and what methods they use are presented in Tables 3-5.

What juvenile fire safety education curricula/ materials are other fire departments using?

Table 3

Where do Fire Departments Get Their Fire Safety Education Materials by Grade Level?

Source	Pre-K	Kindergarten	1st/2nd	3rd/4th
NFA	14	15	16	17
NFPA	26	30	30	30
State office	21	24	25	0
Created locally	23	24	25	23
Insurance co.	13	17	17	16
Other commercial	34	36	36	37

Note: departments were asked to list all sources; most departments listed multiple sources of material

Table 4

Where do Fire Departments Most Frequently Teach Fire Safety by Grade Level?

Location	Pre- K	Kindergarten	1st/2nd	3rd/4th
Schools	33	43	48	48
Fire station	33	33	26	23
Safety village	6	5	4	5
Other	10	8	8	8

Note: The maximum number of respondents was 54.

Table 5

What Key Concepts Does Your Department Stress by Grade Level?

Key Concept	Pre- K	Kindergarten	1st/2nd	3rd/4th
Get out of burning blds.	41	44	52	50
Go low through smoke	45	50	52	46
Stop, Drop & Roll	45	40	45	37
Call 9-1-1	34	41	45	39
Matches & lighter safety	42	41	46	40
Exit drills	25	32	52	52
Home escape plans	17	21	45	49
Smoke alarms	28	36	52	49

Note: The maximum number of respondents was 54.

How do other fire departments establish their fire safety education programs?

Sixty-two questionnaires were returned from fire departments. Of these, eight (12.9%) were rejected because they contained more than the arbitrarily determined allowable number of errors, leaving fifty-four valid questionnaires.

The general demographic information of these respondents is summarized in Table 6.

Table 6

Type	>35[1]	36-75[1]	76-300[1]	300+[1]	Total	Ded Ed[2]	SE Only[3]	Plan[4]	GLS[5]
Career	3	8	8	5	24	15	1	14	11
Comb.	3	21	4	1	29	23	4	22	18
Vol.	1	1	0	0	1	1	0	1	1
Total	7	30	12	6	54	39	5	37	30

[1] Department size
[2] Does the department have a dedicated fire safety educator?

[3] Is fire safety education the educator's only responsibility?
[4] Is the departments fire safety education [the] result of planning?
[5] If planning was used, was it grade level specific?

The summary of how the departments described the planning process used to establish their fire safety education program(s) is detailed in Table 7. Table 8 details what age students are most and least receptive to fire safety education.

Table 7

What Planning Process Was Used to Establish Fire Safety Education Program(s)?

Informal with outside data	10	Informal with dept. data	4
Formal with outside data	10	Informal with dept. data	3
Same way its been done	17	Modeled after other dept.	6
Invalid response	4		

Table 8

What Grade Level do Fire Departments Feel is Most and Least Receptive to Fire Safety Education?

	Pre- K	Kindergarten	1st/2nd	3rd/4th	Blank
Most receptive	4	5	31	13	1
Least receptive	33	0	9	12	0

Note: The maximum number of respondents was 54

What are the characteristics of kindergarten through fourth grade school children?

Figure 1 is a visual representation of the teacher questionnaire questions, which asked teachers to characterize their students with the mean response of each school graphically plotted on the Likert scale. Positive numbers indicate teachers feel there is improvement in the characteristic listed.

Figure 1

Teachers Thoughts About Their Students

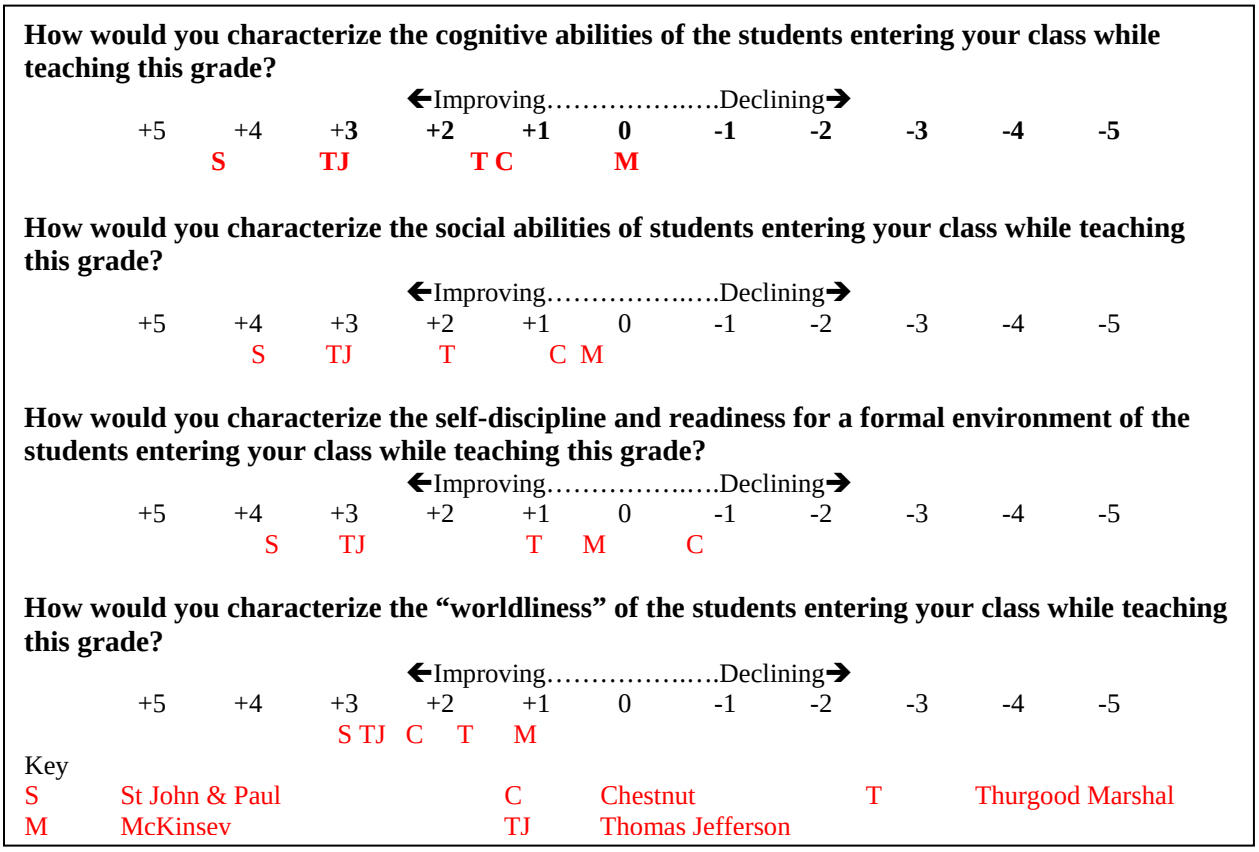
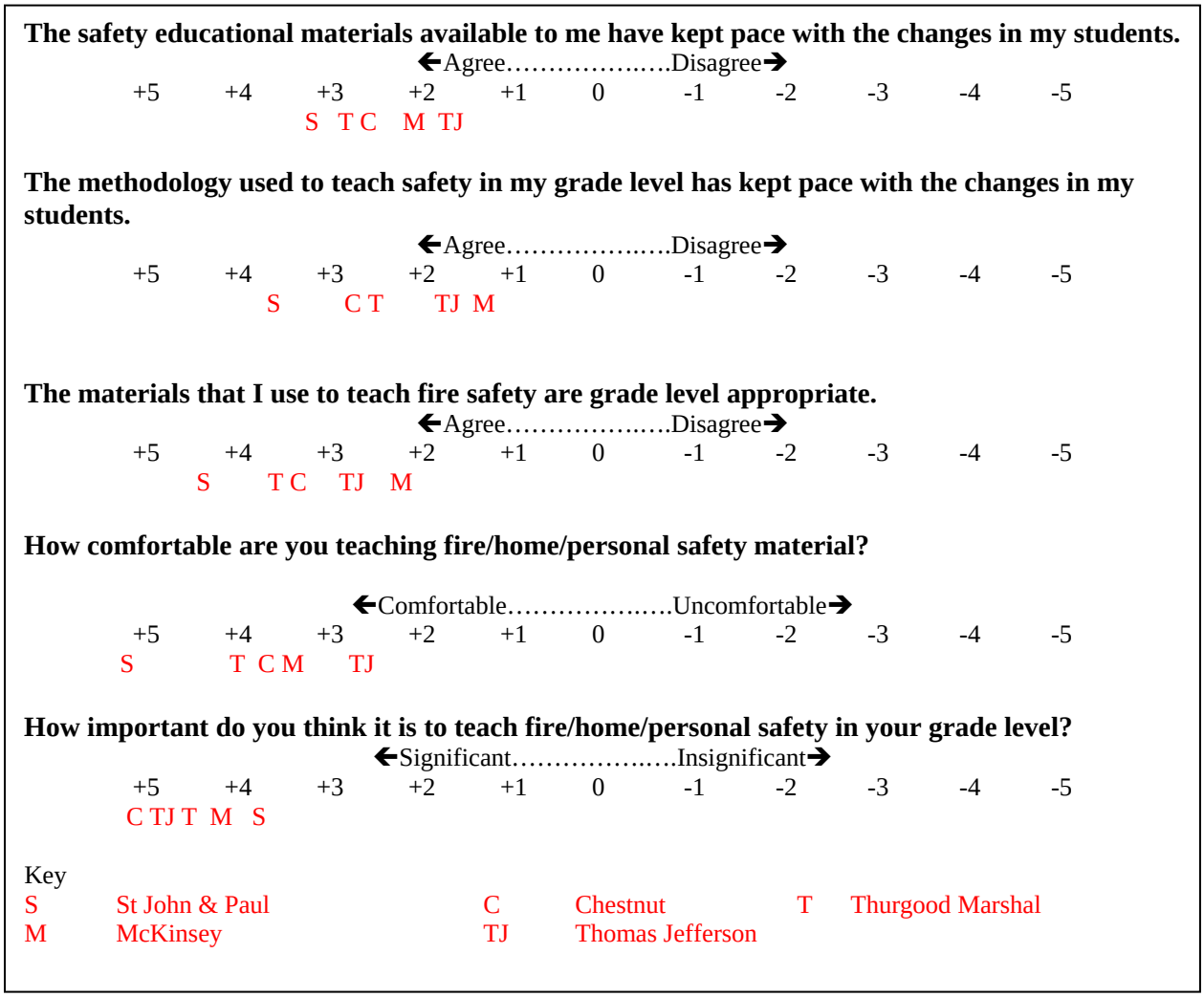


Figure 2 is a visual representation of the teacher questionnaire questions, which asked teachers to characterize their thoughts on fire and safety education with the mean response of each school graphically plotted on the Likert scale. Positive numbers reflect agreement with the statement.

Figure 2

Teacher Thoughts About Fire & Safety Education



Tables 9 and 10 summarize the how teachers describe the characteristics of their students and their thoughts on the most effective teaching techniques. Again, the numbers shown are the mean of all teacher responses, separated by school. The higher the number, the stronger the agreement with the statement in the question.

Tables 11 thru 13 detail teacher thoughts on fire and safety education, including barriers and suggestions to improve risk reduction education.

Table 9

Teachers Describe Student Characteristics

Trait	Chestnut	McKinsey	Thomas Jeff.	Thurgood	John & Paul
Easily bored	2.83	1.3	2.1	2.57	2.5
Short attention span	3.16	3	2.3	2.85	3
Technology savvy	2.5	1.2	2.77	1.71	3
Naturally inquisitive	2.16	1.5	2.3	1.85	3.5
Self directed learners	0	0.5	1.6	-0.42	2.25
Can assimilate info. faster	-0.66	0.33	1.6	-0.85	2.25
Resistant to written material	1.83	1.5	1.33	1.71	2.5

Note: The Likert scale range was +5 for strongly agree to -5 for strongly disagree. Negative numbers indicate disagreement with the statement listed.

What teaching techniques do elementary school teachers think are most effective for their grade levels?

Table 10

Teachers Evaluate Teaching Techniques

Technique	Chestnut	McKinsey	Thomas Jeff.	Thurgood	John & Paul
Multimedia	3.06	3.4	1.88	3.28	2.75
Computer	2.83	3.5	1.8	3.14	2.75
Role play	2.88	3.4	2.1	2.85	3.5
Interactive activities	3.66	3.8	2.5	3.14	3.75
Formal lecture	0.83	0.4	0	1.28	1.25
Teacher led discussion	2.33	0.6	1.6	2.14	2.5
Open discussion	2.83	2.8	1.77	1.85	1.5
Workbooks	2.16	1.2	1.22	1.85	1.25

Note: The Likert scale range was +5 for strongly agree to -5 for strongly disagree. Negative numbers indicate disagreement with the statement listed.

Table 11

Teachers Rank the Most Effective Way to Teach Safety in Their Classrooms.

	Chestnut	McKinsey	Thomas Jeff.	Thurgood	John & Paul
Teacher Only	0	0	0	0	0
Teacher with PSP[1] support	2	2	4	4	0
PSP with Teacher Support	4	2	5	3	3
PSP Only	0	0	0	0	0
Invalid Response[2]	1	1	0	0	1

[1]PSP is an abbreviation for Public Safety Professional, the term used in the questionnaire.
[2]Invalid response indicates either no response, or more responses that were allowed by the premise of the question.

Table 12

Teachers Rank the Primary Barrier to Effective Fire Safety Education in Their Grade.

	Chestnut	McKinsey	Thomas Jeff.	Thurgood	John & Paul
Socio economic	1	0	2	1	0
Lack of time	4	3	0	1	2
Lack of materials	1	2	3	3	1
Lack of student interest	0	0	0	0	0
Maturity of students	0	0	0	0	0
Other	1	0	1	0	0
Invalid response[1]	0	0	3	2	1

[1]Invalid response indicates either no response, or more responses that were allowed by the premise of the question.

Table 13

Teachers Rank the Biggest Factor to Improve Fire Safety Education in Their Grade.

	Chestnut	McKinsey	Thomas Jeff.	Thurgood	John & Paul
More class time	0	2	0	3	0
Multi-media technology	0	1	1	1	1
Parental involvement	4	0	2	1	0
Support from PSP	2	2	2	2	2
Other	1	0	2	0	0
Invalid response[1]	0	0	2	0	1

[1]Invalid response indicates either no response, or more responses that were allowed by the premise of the question.

Table 14 summarizes the demographic information of the schools who participated in the questionnaire and the questionnaire return rate.

Table 14

General Information on Elementary Schools Queried

	KG[1]	01[1]	02[1]	03[1]	04[1]	% FL[2]	T/E[3]	Returned[4]	%[5]
Chestnut	40	37	30	41	27	89	238	7/9	77
McKinsey	46	45	42	56	52	71	372	5/11	45
Thomas Jefferson	70	88	57	57	57	52	432	9/15	60
Thurgood	33	37	34	32	29	92	227	7/10	70
St John & Paul	24	23	24	28	18	30	162	4/4	100

[1]Total student enrollment by grade level.
[2]Percentage of students in school who meet the Federal guidelines to receive free/reduced price lunch, used as an economic indicator of school.
[3]Total enrollment of school.
[4]Number of questionnaires sent and returned.
[5]Percentage of questionnaires returned.

Discussion

What juvenile fire safety education curricula/ materials are other fire departments using?

There were few surprises in the questionnaire results regarding what materials fire departments are using. The NFPA, USFA, and State Fire Marshal's were the most common responses. "Other Commercial" source was also frequently cited; however, in the interest of increasing questionnaire return rates, the instrument was deliberately kept brief. In retrospect, it would be valuable to know what sources of material that fire departments are using that fall into the "other" category.

There were also few surprises regarding the programs and curricula that fire departments use. Multimedia, lectures, activities, station tours, and handouts were the most frequently cited. A surprisingly few number of departments stated they use characterization or coordinated programs. A fact that may be attributed to the cost of these programs in comparison to the other materials that are available.

Risk Watch is one of the few, if not the only, coordinated risk reduction program developed in conjunction with education professionals and the fire service, yet only characterization and home safety inspection were cited by departments less frequently. The questionnaire did not explore why fire departments did or did not choose specific programs- a research endeavor that would be worthwhile. A likely assumption is that Risk Watch is cost prohibitive.

Simply put, the challenge facing fire departments regarding fire safety materials is not the lack of material; it is the staggering volume of material that is available to choose from, lack of formal evaluation of the materials' effectiveness, cost, and fire departments lack of a clear set of expectations.

How do other fire departments establish their fire safety education programs?

According to Wren "The most noble efforts of the fire service are those in which it strives to put itself out of business…" (1995, p.58). Unfortunately, this is not a common fire service view toward fire prevention or risk reduction. Firefighters are less-than-enthusiastic about public education and fire prevention for various reasons. Consider the long-standing tradition in many departments (including the author's) where the "rookie" is responsible for station tours and public education assignments. The newest member of the department is given the assignment to "handle the tour" with little or no oversight or guidance. Fire prevention messages are not coordinated, evaluated, and are frequently just parroted from past activities. If extra funding becomes available, the department may buy a new video, DVD or some free items to hand out to students.

Almost 72% of responding fire departments reported having a dedicated fire safety educator, but only 9% reported that education was that member's only responsibility. Almost a third of the departments who responded to the questionnaire had no dedicated planning process to create their fire safety education message. Thirty-seven departments reported having a planning process, but only twenty said it was grade level specific and only thirteen departments described their planning process as formal. There was almost an equal split between the departments that described a planning process and those that reported they were doing it the same way they always did, or modeled someone else.

Perhaps the disparity and conflicts in how fire departments describe their planning processes are the result of the instrument itself. It is also possible that the results of the fire department questionnaire simply reflect the sometimes-schizophrenic nature of the fire service.

On the other hand, the challenge may simply be the enormous amount of material that is available. Faced with a daunting number of options, department's may simply be relying on name recognition to select the materials/curricula they use without much thought about if the materials are applicable to their fire problems. Alternatively, departments are just doing what they have always done, saw someone else do, or think they should be doing. The lack of a formal national program is founded in the locality of fire departments; even so, fire departments are not making their fire safety education programs local. We order material and hand it out.

Perhaps the most important reference in this entire document is Ms. Gerstner's comment about kids under five years old not controlling their own destinies. Fire departments struggle for classroom time to educate kids- maybe we should abandon the sacred cow -fire station tour that culminates with a firefighter in complete protective equipment or sliding down the pole and focus on the parents instead. Home safety inspections were the least common fire department program cited in this research; perhaps we should consider redirecting our efforts to a combination of the children **and** their parents, using the home safety inspection as a segue into the home. The results of the teacher survey support this theory as well; almost 25% of the teachers felt parental involvement was the single biggest factor that could improve fire safety education. Interestingly, the most commonly cited primary barrier to effective fire safety education was lack of time. When asked to rank the "biggest factor to improve" education, the teachers chose support from public safety professionals, not more class time. The teachers seem to be asking for help to make the time they have available more effective. A final thought for fire departments evaluating their programs is that of materials was the number two barrier listed by the teachers.

What are the trends in the characteristics of kindergarten through fourth grade school children?

The data collected from the teachers seems to confirm the socio-economic correlation between teacher attitudes and fire safety education. When asked for a simple indicator of socio-economic condition, the school district suggested using the percentage of students who qualify for free or reduced lunches (Table 14). Figure 1 seems to indicate a clear connection between the teachers' perceptions of incoming students and the socio-economic status of the school. Interestingly, there is an inverse correlation between socio-economic status and the first three questions in Figure 2. The schools with lower percentages of economically-pressured students seem to be saying the fire safety education materials are not keeping up with their students, while the schools with higher percentages of "free lunch" students seem to feel the materials are current. Table 9 again illustrates the economic correlation. The schools with the highest percentage of economically pressured students are described by their teachers as less inquisitive, technologically perceptive, and so on. Of note, only four teachers completing the questionnaire ranked socio-economic condition as the primary barrier to effective fire safety education (Table 12). Lack of time and proper materials are the more commonly cited barriers (Table 12).

The data collected in this research seems to support the presumption in the literature review that children from stable, financially secure homes generally perform better in school.

What teaching techniques do elementary school teachers think are most effective for their grade levels?

The teachers were consistent in their opinions toward the most effective teaching techniques. They favored the interactive, methods over the more formal options. They seem to favor techniques that get the children involved and active, a philosophy consistent with all of the

literature reviewed in this research. This should be sobering news for fire departments, given the high percentages of departments that said they use lectures when teaching fire safety.

Fire station tours may offer a solution, if fire departments take the time to prepare a coordinated, age-appropriate presentation that incorporates several of the preferred teaching techniques. For this to succeed, we are going to have to spend more of our training time teaching firefighters effective methods to teach fire safety at different age levels.

The teachers also overwhelmingly preferred a cooperative effort with public safety professionals to more effectively teach risk reduction in their classrooms. They were, however, almost equally split on which group should take the lead. Regardless of who takes the lead, this teacher sentiment seems to present an opportunity for fire departments to partner with teachers to advance the fire safety message.

The NCLBA has severely reduced the amount of time available to firefighters to enter classrooms and present the fire safety message. Incorporating risk reduction messages into the compulsory science and health curricula may be the only way that fire departments can interact with elementary school children in the classroom.

An article cited in the literature review challenging engineers to get involved in math and science education in elementary schools provides a blueprint that fire departments can adapt and use quite effectively. As detailed previously, vast amounts of educational materials are available to fire departments and we also have access to alternative funding sources. Teachers have been trained how to effectively educate children, but have varied responsibilities and limited time. The most effective solution is a collaborative partnership where both parties will have to modify their pre-conceived expectations and work together to reduce the catastrophic fire casualty rate.

Recommendations

The following recommendations are the result of this research. The ADF specific recommendations are listed first, followed by some general recommendations for the fire service.

The ADF should immediately conduct a review of the causes of fires for the last several years to identify the local fire problem in Ashtabula. This review should then be used as the foundation for a complete overhaul of the fire safety education program.

The ADF needs to figure out how to reach out to the parents of elementary-age children. Home safety inspections may be one way to accomplish this, but the aha moment in this research is the statement that small children do not control their own destinies. Child-only directed efforts in the schools have value, but we have to get the parents involved in the process.

Despite the challenges, ADF needs to reach out to the elementary schools to create the contacts and relationships needed to incorporate fire safety (and risk reduction) education into the regular classroom teaching schedule. The end of the current school year may be a good time to approach the school district to formulate a plan for the next academic year.

The ADF should focus its grant writing and collateral funding efforts on obtaining resources for the elementary school teachers to use.

The fire service, in general, is supremely confident in its ability to complete any task. To dramatically improve the quality and effectiveness of our fire safety education efforts; we need to restrain this confidence and reach out to professional educators. Effectively teaching elementary school children is a complex task that requires the appropriate skill set.

Firefighter training must be revised to include more information about effective public education techniques and the need for the fire service to focus more of its efforts on fire prevention.

References

Ashtabula Division of Fire. (1998-2008). *NFPA Fire Experience Survey* [Fire Department Reports]. Ashtabula, Ohio: Firehouse Software.

Bland, M., Saunders, G., & Frisch, J. (2007, November). In defense of the lecture. *Journal of College Science Teaching*, *37*(2), 10-13. Retrieved March 27, 2008, from: Academic Search Complete database.

Carter, H., Rausch, E. (1999). *Management in the fire service*. Quincy, MA: National Fire Protection Association.

Denton, K., West, J. (2002). *Children's reading and mathematics achievement in kindergarten and first grade* (NCES 2002125). Washington, DC: US Department of Education. Retrieved March 11, 2008, from: http://nces.ed.gov/pubs2002/2002125.pdf

Firefighter Phil. (2008). Retrieved January 5, 2008, from http://www.officerphil.com/

Hellner, J. (2007). A pathway to creativity in the curriculum: Teaching a skill. *Education Today*, Retrieved March 28, 2008, from: http://nces.ed.gov/programs/digest/d07/

Home safety council programs. (2008). Retrieved February 22, 2008, from: http://www.homesafetycouncil.org/index.aspx

Kirtley, Edward. (2003). Fire and life safety education: Theory and techniques. In *Fire Protection Handbook Volume I* (pp. 5-31). Quincy, MA: National Fire Protection Association.

Kiurski, T. (2008, January). Fire Safety Education from the ground up. *Fire Engineering, 161*(1), 206-207.

Lapkoff, S., & Li, R. (2006, Best Of 2006-2007). Five trends for schools. *Educational Leadership*, Retrieved April 1, 2008, from: Academic Search Complete database.

McFarland, M. (2001). *Teaching strategies that effectively use multimedia*. Retrieved March 24, 2008, from: http://www.pbs.org/wgbh/globalconnections/multimedia/strategies.html

Nachbar, M. (1995). Public education. In J. Bachtler & T. Brennan (Eds.), *The Fire Chief's Handbook* (p. p. 1075). Saddlebrook, NJ: Fire Engineering Books & Videos.

National Center for Education Statistics. (2007). *Digest of Education Statistics 2007* (2007). Washington, DC: US Department of Education. Retrieved March 11, 2008, from: http://nces.ed.gov/programs/digest/d07/

On The Market (2007, November). *Fire Rescue Magazine, 25*(11), 118.

Product Rewind [Special issue]. (2007). *Fire Chief, 51*(12).

Products/services/media [Special issue]. (2007). *Fire Engineering, 160*(12).

Rock, M., Gregg, M., Ellis, E., & Gable, R. (2008, Winter). REACH: A Framework for Differentiating classroom instruction. *Preventing School Failure, 52*(2), 31-47. Retrieved March 27, 2008, from: Academic Search Complete database.

Santrock, J. (2002). *Life-span development* (J. Karpacz, Ed.). New York: McGraw Hill. (Original work published 1997).

Schaps, E. (May 2007). *Why the No Child Left Behind Act is unsalvageable*. (Original work published 2007). Retrieved March 21, 2008, from http://www.keepartsinschools.org/News/Materials/education%20Week_%20Why%20the%20No%20Child%20Left%20Behind%20Act%20Is%20Unsalvage...pdf

Senge, P. (2000). *Schools that learn*. New York: Doubleday.

Swift, T., & Watkins, S. (2004, July). An engineering primer for outreach to K-4 education. *Journal of STEM Education Innovations & Research*, *5*(3/4), 67-76. Retrieved April 1, 2008, from: Academic Search Complete database.

USFA Publications [Electronic version]. (n.d.).

Using video effectively. (2008). Retrieved March 25, 2008, from: http://www.kqed.org/topics/education/educators/videoclassroom/effective.jsp

Voltz, D., & Fore, I. (2006, November). Urban special education in the context of standards-based reform. *Remedial & Special Education*, *27*(6), 329-336. Retrieved April 1, 2008, from: Academic Search Complete database.

Voltz, D. (2000) Challenge and choices in urban teaching: The perspectives of general and special educators, *Multiple Voices of Ethnically Diverse Exceptional Learners 4*(1), 1-4.

Why use video in the classroom. (n.d.). Retrieved March 24, 2008, from: http://www.thirteen.org/edonline/ntti/resources/video1.html

Wren, M. (1995). *The fire chief's handbook* (5th ed.) (J. Bachtler & T. Brennan, Eds.). Saddlebrook, NJ: PennWell Publishing Company.

Appendix A

LCRR problem solving chart

Appendix B

Fire Safety Education Questionnaire

Appendix C

Cover letter for Fire Department Questionnaire

Colleagues,

I would greatly appreciate your assistance with my current Executive Fire Officer Program Applied Research Project. I am conducting research on how fire departments construct their juvenile fire safety message(s).

Please take a few moments to complete a brief electronic questionnaire. The survey is located here www.ashtabulafire.com, then click on the juvenile fire safety questionnaire.

If you are interested in the results, you can supply your email address within the questionnaire and I will send them when they are complete.

Thank you in advance for your assistance.

Ron Pristera
Ashtabula Division of Fire
chiefafd@alltel.net
440 992 7186

Appendix D

Elementary Teacher Questionnaire

About you

What grade level do you teach? PK K 1or2 3or4

How long have you been teaching this grade? _____ At this school_____

About your students

How would you characterize the cognitive abilities of the students entering your class while teaching this grade?

←Improving…….Declining→

+5 +4 +3 +2 +1 0 -1 -2 -3 -4 -5

How would you characterize the social abilities of students entering your class while teaching this grade?

←Improving…….Declining→

+5 +4 +3 +2 +1 0 -1 -2 -3 -4 -5

How would you characterize the self-discipline and readiness for a formal environment of the students entering your class while teaching this grade?

←Improving…….Declining→

+5 +4 +3 +2 +1 0 -1 -2 -3 -4 -5

How would you characterize the "worldliness" of the students entering your class while teaching this grade?

←Improving…….Declining→

+5 +4 +3 +2 +1 0 -1 -2 -3 -4 -5

The following descriptors are frequently used when discussing the current generation of students. How accurately do they describe your students?

	Very Accurate								Very Inaccurate
Easily Bored	4	3	2	1	0	1	2	3	4
Short attention span	4	3	2	1	0	1	2	3	4
Technologically savvy	4	3	2	1	0	1	2	3	4
Naturally inquisitive	4	3	2	1	0	1	2	3	4
Self directed learners	4	3	2	1	0	1	2	3	4
Capable of assimilating material faster	4	3	2	1	0	1	2	3	4
Resistant to written material	4	3	2	1	0	1	2	3	4

About Teaching

How effective do you feel the following teaching methods are for the students in your grade?

	Very Effective								Very Ineffective
Multimedia (CD, Video)	4	3	2	1	0	1	2	3	4
Computer (games, internet)	4	3	2	1	0	1	2	3	4

Role play/games	4	3	2	1	0	1	2	3	4
Interactive activities		4	3	2	1	0	1	2	3	4
Formal lecture		4	3	2	1	0	1	2	3	4
Teacher led discussion		4	3	2	1	0	1	2	3	4
Open discussion		4	3	2	1	0	1	2	3	4
Workbooks/written Assignments		4	3	2	1	0	1	2	3	4

About Fire & Safety Instruction

The safety educational materials available to me have kept pace with the changes in my students.

←Agree……..….Disagree→

+5 +4 +3 +2 +1 0 -1 -2 -3 -4 -5

The methodology used to teach safety in my grade level has kept pace with the changes in my students.

←Agree……..….Disagree→

+5 +4 +3 +2 +1 0 -1 -2 -3 -4 -5

The materials that I use to teach fire safety are grade level appropriate.

←Agree……..….Disagree→

+5 +4 +3 +2 +1 0 -1 -2 -3 -4 -5

How comfortable are you teaching fire/home/personal safety material?

←Comfortable……..….Uncomfortable→

+5 +4 +3 +2 +1 0 -1 -2 -3 -4 -5

How important do you think it is to teach fire/home/personal safety in your grade level?

←Significant……..….Insignificant→

+5 +4 +3 +2 +1 0 -1 -2 -3 -4 -5

What do you think is the most effective way to teach fire/home/personal safety in your classroom?

Teacher only. Teacher supported by public safety professionals.

Public Safety Professionals supported by teacher. Public Safety Professionals only.

What is the primary barrier to effective fire safety education in your grade level? PLEASE CHOOSE ONLY ONE!

Socio economic factors Lack of classroom time Maturity of students
Lack of effective materials Lack of student interest in topic

Other:_____

What is the single biggest factor that would make fire safety education more effective in your grade level? PLEASE CHOOSE ONLY ONE!

More classroom time Multi-media technology Parental involvement/support
Support from public safety professionals Other:_____

Comments:

Appendix E

Elementary School Teacher Questionnaire Cover Letter

Greetings,

Attached is a brief questionnaire that will help me complete an Applied Research Project for a program that I am completing at the National Fire Academy.

My project is exploring the effectiveness of the fire safety/prevention education that the fire service teaches and supplies to elementary teachers in grade levels K-4.

In light of the limited classroom time and sparse resources, I believe it is crucial to maximize the effectiveness of fire safety education. Considering the number of fires intentionally or accidentally started by kids in our community and the number of children killed in fires over the last ten years, this project will help our department formulate a coordinated fire safety education program.

Your experience and assistance is invaluable! Please take a few moments to complete the questionnaire and feel free to add any thoughts or comments that you have on the subject.

If you want a copy of the tabulated results, or a copy of the completed research project, please indicate that on the form.

Respectfully,

Ron Pristera